

WHAT IS CLAIMED IS:

1. A method for analyzing a cell by suppressing non-biological movement comprising the steps of:

placing the cell in a solution having a viscosity enhancement medium; and

measuring the motility of the cell in the solution.

2. A method as described in Claim 1 wherein the viscosity enhancement medium is methyl cellulose.

3. A method as described in Claim 1 wherein the viscosity enhancement medium is hyaluronic acid or chondroitin sulfate or cellulose ester or poly sacharide.

4. A method as described in Claim 1 wherein multiple cells are measured in parallel.

5. A method as described in Claim 1 wherein the placing step includes the step of placing the cell in the solution of between 0.1% to 0.2% by total volume of methyl cellulose for 2D analysis of motility.

6. A method as described in Claim 2 wherein the placing step includes the step of placing the methyl cellulose solution having a concentration of between 0.1% and 1.2% methyl cellulose onto cells in culture medium to provide a layer of methyl cellulose-containing medium for 2D analysis of motility.

8. A method as described in Claim 1 wherein the placing step includes the step of placing cells in solution having a concentration of between 0.3% to 2.5% weight per volume methyl cellulose for analysis of motility in 3D.

placing the cell in a solution; and

10. A method for analyzing a cell by suppressing non-biological movement comprising the steps of:

identifying and quantifying short lived effects or transient effects of added moiety on motility of the cell in the solution.

placing the cell in a solution having a viscosity of about 100-5000 centipose; and

performing two-dimensional or three-dimensional migration analysis on the cell in the solution.

12. A method for analyzing a cell comprising the steps of:

placing the cell in a solution having a viscosity of about 100-5000 centipose; and

analyzing migration of the cell in the solution which occurs without adherence.

13. A method for analyzing a cell by suppressing non-biological movement comprising the steps of:

placing the cell in a solution; and

controlling ambient motion of the cell in the solution as a reproducible method for analysis of motion in a 2D or 3D environment with non-adherent cells.

14. A method for analyzing a cell by suppressing non-biological movement comprising the steps of:

placing the cell in a solution; and

analyzing 3D motion of the cell in the solution in the absence of a solid matrix upon which the cell can attach.

15. A method for analyzing a cell by suppressing non-biological movement comprising the steps of:

placing the cell in a solution; and

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suppressing the ambient non-biological motion of the cell in the solution on a 2D surface when there is no attachment involved of the cell.

16. A method as described in Claim 1 wherein the placing step includes the step of placing the cell in the solution of between 1% to 5% by total volume of methyl cellulose and a concentration of between 0.08% and 0.12% of methyl cellulose.

17. A method for analyzing a cell comprising the steps of:

placing the cell in a solution having a viscosity of about 100-5000 centipose; and

measuring motility of the cell in the solution, where surface attachment by the cell is not utilized.

18. A method for analyzing a cell by suppressing non-biological movement comprising the steps of:

placing the cell in a solution; and

forming a thin film in the solution whose viscosity resists brownian and other non-biological sources of motion but does not interfere with active cell biological motion.

19. A method for analyzing a cell by suppressing non-biological movement comprising the steps of:

placing the cell in a solution;

adding a protein or other biological or chemical moiety to the solution; and

analyzing the effect of the protein on cell motility, morphology, phenotype, division rate, cell death, or blebbing or disease state.

20. A method as described in Claim 23 wherein the protein is a human protein, antibody, growth factor, cytokine, kinase or protease.

21. A method as described in Claim 23 wherein the protein is transduced or transfected into the cell.

22. A method for analyzing a cell by suppressing non-biological movement comprising the steps of:

placing the cell in a solution;

adding a protein to the solution; and

analyzing the protein function regarding the cell using cell motility as an analytical marker.

23. A method for analyzing a cell by suppressing non-biological movement comprising the steps of:

placing the cell in a solution; and

placing methyl cellulose in the solution to reduce ambient motion of the cell in the solution and eliminate convective motion.

24. A method for suppressing non-biological movement of a cell comprising the steps of:

placing the cell in a solution; and

forming a layer of methyl cellulose 34 to 137  $\mu$ m thick in the solution.

25. A method for analyzing a cell by suppressing non-biological movement comprising the steps of:

placing the cell in a solution; and

using methyl cellulose in the solution for stopping the effects of gravity on the cell in the solution.

26. A method for analyzing a cell by suppressing non-biological movement comprising the steps of:

placing the cell in a solution; and

using methyl cellulose in the solution for reducing or eliminating the effects of micro-turbulances due to thermal convection in the solution.

27. A method for analyzing a cell comprising the steps of:

placing the cell in a solution; and

introducing methyl cellulose in the solution for stopping motion of the cells due to mechanical movement of a plate on which the cells are disposed.

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28. A method for analyzing a cell comprising the steps of:

placing the cell in a solution; and

introducing a viscous fluid having a viscosity of about 100-5000 centipose in the solution for stopping or reducing the effects of gravity on the cell.

29. A method for analyzing a cell comprising the steps of:

placing the cell in a solution; and

introducing a viscous fluid having a viscosity of about 100-5000 centipose in the solution for reducing the effects of micro-turbulences due to thermal convection.

30. A method for analyzing a cell comprising the steps of:

placing the cell in a solution; and

introducing a viscous fluid having a viscosity of about 100-5000 centipose in the solution for stopping motion of the cells due to mechanical movement of the plate.

31. A method for analyzing a cell by suppressing non-biological movement comprising the steps of:

placing the cell in a solution; and

using methyl cellulose or any viscous fluid to separate biological motility from ambient motility.

32. A method for analyzing cells comprising the steps of:

placing the cells in a solution; and

measuring biological cell motility for adherent or nonadherent cells in the solution.

33. A method for analyzing cells comprising the steps of:

placing the cells in a solution; and

measuring biological motility of both adherent and nonadherent cells using visible and fluorescent images.

34. A method for analyzing a cell comprising the steps of:

placing the cell in a solution; and

measuring swimming vs moving of cells in the solution in a 2D plane, as cells move up into a viscous layer of the solution.

35. A method for analyzing a cell comprising the steps of:

placing the cell in a solution; and

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measuring the effect tilt has on cell motion, by changing the angle a plate is tilted on which the cell is disposed and looking for changes in motion or cell attachment of the cell.

36. A method for analyzing a cell comprising the steps of:

placing the cell in a solution having methyl cellulose;

removing the methyl cellulose from the solution;

treating the cell with a desired material; and

reintroducing the methyl cellulose into the solution.

37. A method for analyzing cells comprising the steps of:

placing the cells in a solution; and

identifying specific subpopulations of cells of similar phenotype which show similar specific responses in motile behavior toward various stimuli.

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